COUNCIL OF ECONOMIC ADVISERS
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MEMORANDUM FOR THE CABINET COUNCIL ON ECONOMIC AFFAIRS

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SUBJECT: The Determinants of Total Federal Expenditures

Questions

This brief memorandum addresses three questions:

1. What have been the primary conditions affecting total federal expenditures in the period from World War II through 1980?

2. Do the levels of prior debt or current tax receipts have any significant effect on total federal expenditures?

3. How well do the determinants of total federal expenditures through 1980 explain the level of total federal expenditures since 1980?

Approach

The basic hypothesis is that total federal expenditures are a function of the size of the economy, the stage of the business cycle, and temporary conditions affecting defense spending. Specifically,

$$E = aY + bY + cUY + d\,MP + uY,$$

where

E = total federal expenditures (national income account)

Y = GNP,

U = civilian unemployment rate,

M = armed forces overseas,

P = implicit price deflator
total federal purchases 1948-1971
national defense purchases 1972-1980, and

u = unexplained residual.

Dividing the above equation by Y yields the basic test equation for the federal share of GNP,

$$\frac{E}{Y} = a + b\,y + c\,U + d\,\frac{MP}{Y} + u,$$

where

y = real GNP per capita.

The parameter b may be positive or negative, depending on whether an increase in real GNP per capita increases or reduces the federal share of GNP. The parameters c and d are expected to be positive. The attached graphs illustrate each of the variables in the basic test equation.

The expanded hypothesis is that total federal expenditures may also be a function of the levels of prior debt and current tax receipts. The test equation including these conditions is

$$\frac{E}{Y} = a + b\,y + c\,U + d\,\frac{MP}{Y} + e\,\frac{D\text{-}1}{Y} + f\,\frac{R}{Y} + u,$$

where

D-1 = net federal debt (total financial liabilities minus total financial assets -- from the Eisner estimates) at the end of the prior year, and

R = total federal tax receipts (national income account).

The parameter e may be positive or negative, depending on whether the net interest on the prior net debt is larger or smaller than the effect of the prior net debt in constraining current non-interest expenditures. The parameter f may also be positive or negative, depending on whether an increase in tax receipts leads to higher or lower expenditures.

The basic and expanded test equations are each estimated from a sample of the years 1948 through 1980.

Estimates

The table below presents the estimates of both the basic and expanded test equations.

Variables	Coefficient	S.E.	"t"	Coefficient	S.E.	"t"
a	-.005	.020	-.2	-.004	.049	-.1
Y	.024	.002	10.2	.016	.004	3.0
U	.008	.002	5.5	.009	.002	5.6
MP/Y	.051	.007	7.1	.047	.007	6.9
$D-_1/Y$				-.029	.021	-1.4
R/Y				.241	.192	1.3
AR (1)	.330	.180	1.8	.151	.210	.7
Test Statistics						
	.904			.910		
D.W.	1.82			1.82		

The basic test equation "explains" over 90 percent of the variance in the federal expenditure share of GNP, and each of the coefficients is highly significant. The major results are the following:

-- An increase in rel GNP per capita (for given levels of U and MP/Y) has strongly increased the federal expenditure share of GNP. The marginal propensity of federal expenditures has increased from .15 in 1948 to .30 in 1980.

-- An increase in the unemployment rate by 1 percentage point increases the federal expenditures share of GNP by about 0.8 percentage points.

-- A substantial part of the variation in total federal expenditures has been associated with changes in the number of armed forces overseas. As of 1980, total federal spending increased by nearly $100,000 for each additional member of the armed forces serving abroad.

The expanded test equation "explains" about 91 percent of the variance in the federal expenditure share of GNP, but the coefficients on the added variables, although interesting, are not highly significant. The major results from the expanded test equation are the following:

-- The major results from the basic test equation are not changed by the added variables, except that the marginal propensity of federal expenditures is about two-thirds of the basic estimate.

-- An increase in the net debt in the prior year may reduce total federal expenditures, even though it increases net interest payments in the current year.

-- An increase in current tax receipts, for a given level of GNP and other conditions, may increase current federal expenditures.

These results suggest a pattern of reducing federal expenditures in response to a prior increase in federal debt and increasing expenditures in response to an increase in the current average tax rate. These results, however, are only suggestive, because the coefficients on these added variables are not highly significant.

Federal Expenditures Since 1980

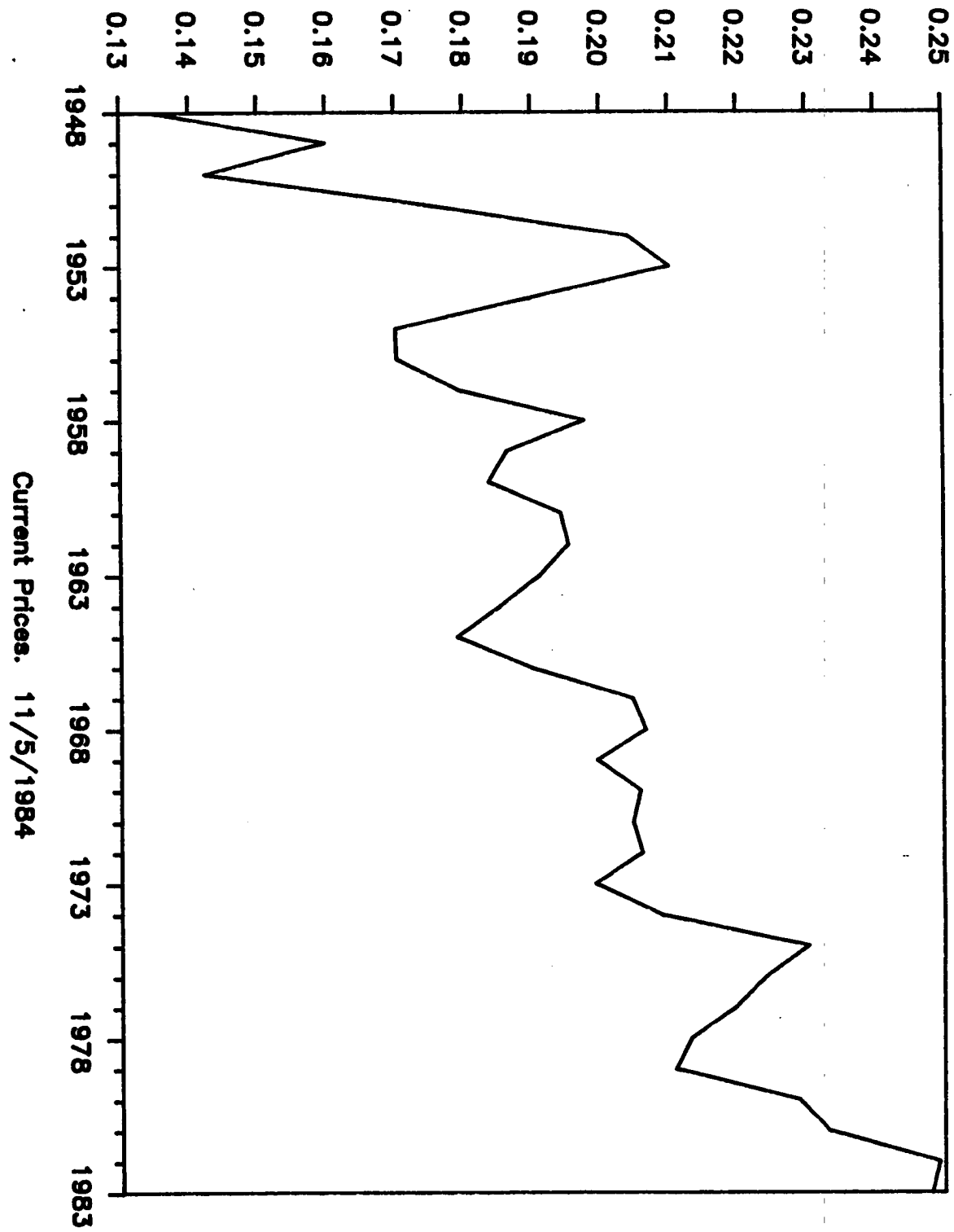
The basic test equation, based on a sample of the years 1948 through 1980, has been used to estimate total federal expenditures in the years 1981 through 1983. A comparison of these out-of-sample estimates with the actual expenditures provides an interesting test of whether the basic determinants of federal spending have changed in this administration. These results are reported below.

Federal Expenditures/GNP

	Actual	Estimated
1881	.233	.233
1982	.249	.247
1983	.248	.249

The last of the attached charts illustrates the actual and estimated federal expenditure share of GNP for the whole period 1948 through 1983. These results suggest that there has been no significant change in the basic determinants of total federal expenditure in the years 1981 through 1983.

Attachments

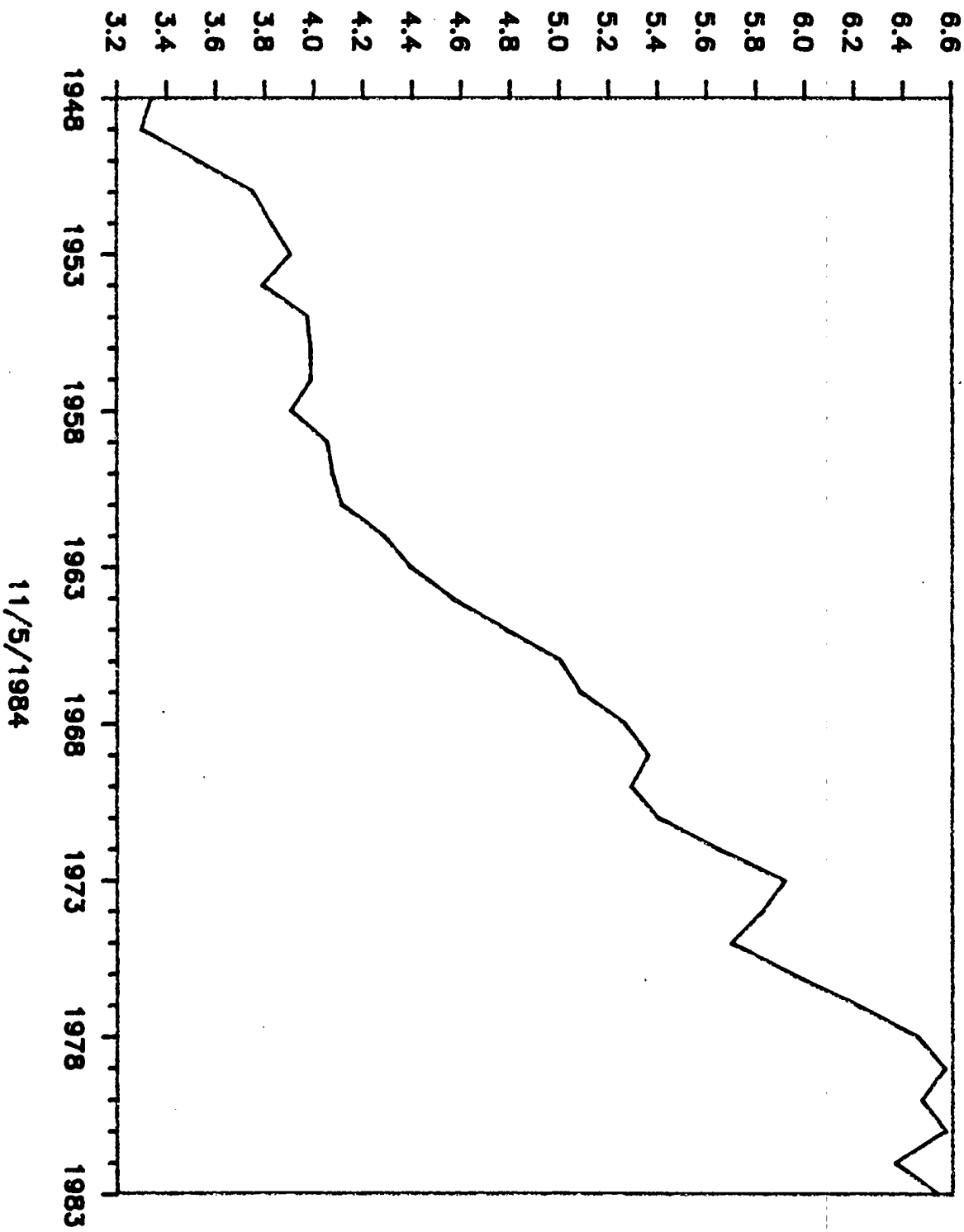


EXPENDITURES AS A FRACTION OF GNP

1948 TO 1983

Current Prices. 11/5/1984

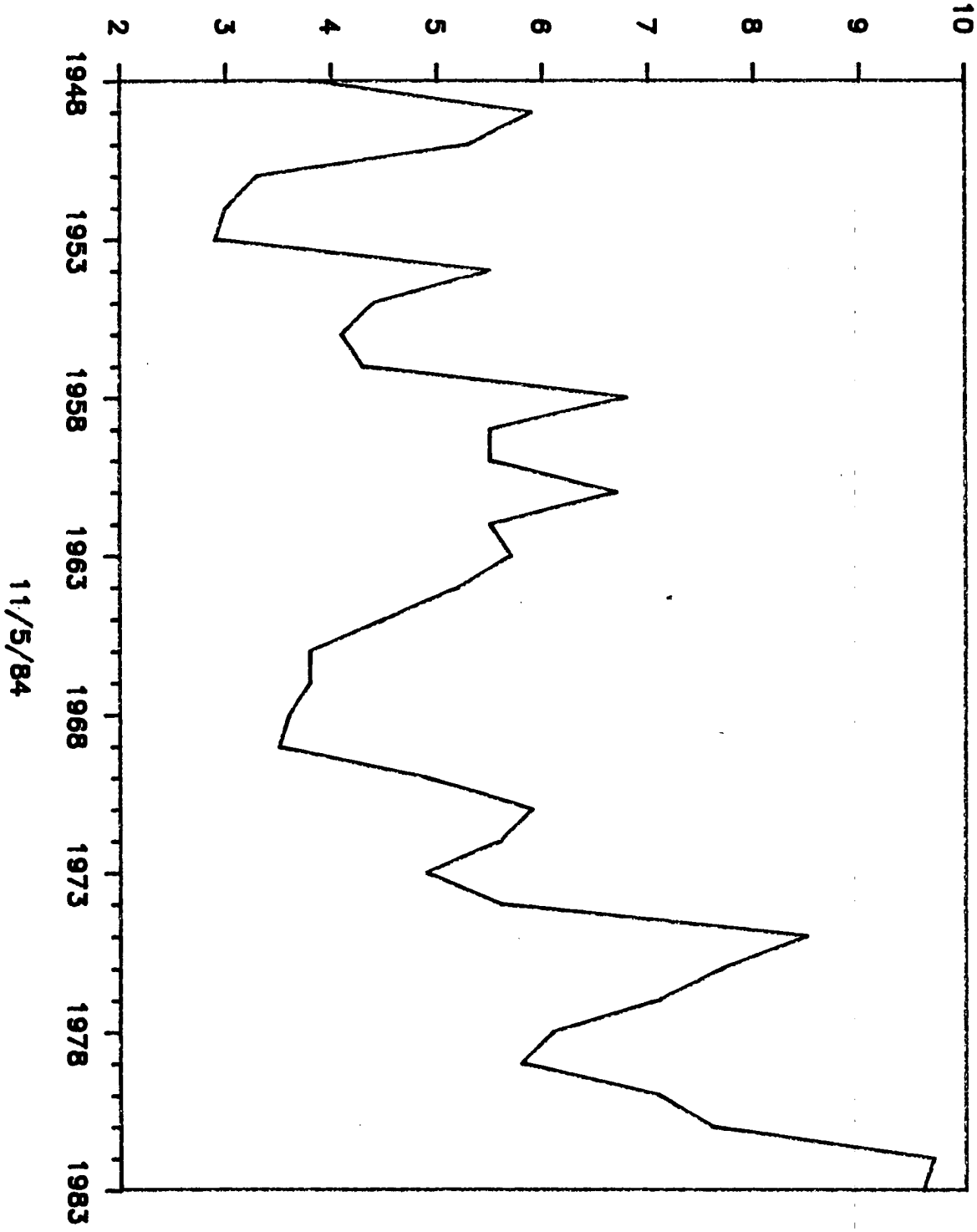
(THOUSANDS OF 1972 DOLLARS)



REAL GNP PER CAPITA

1948 TO 1983

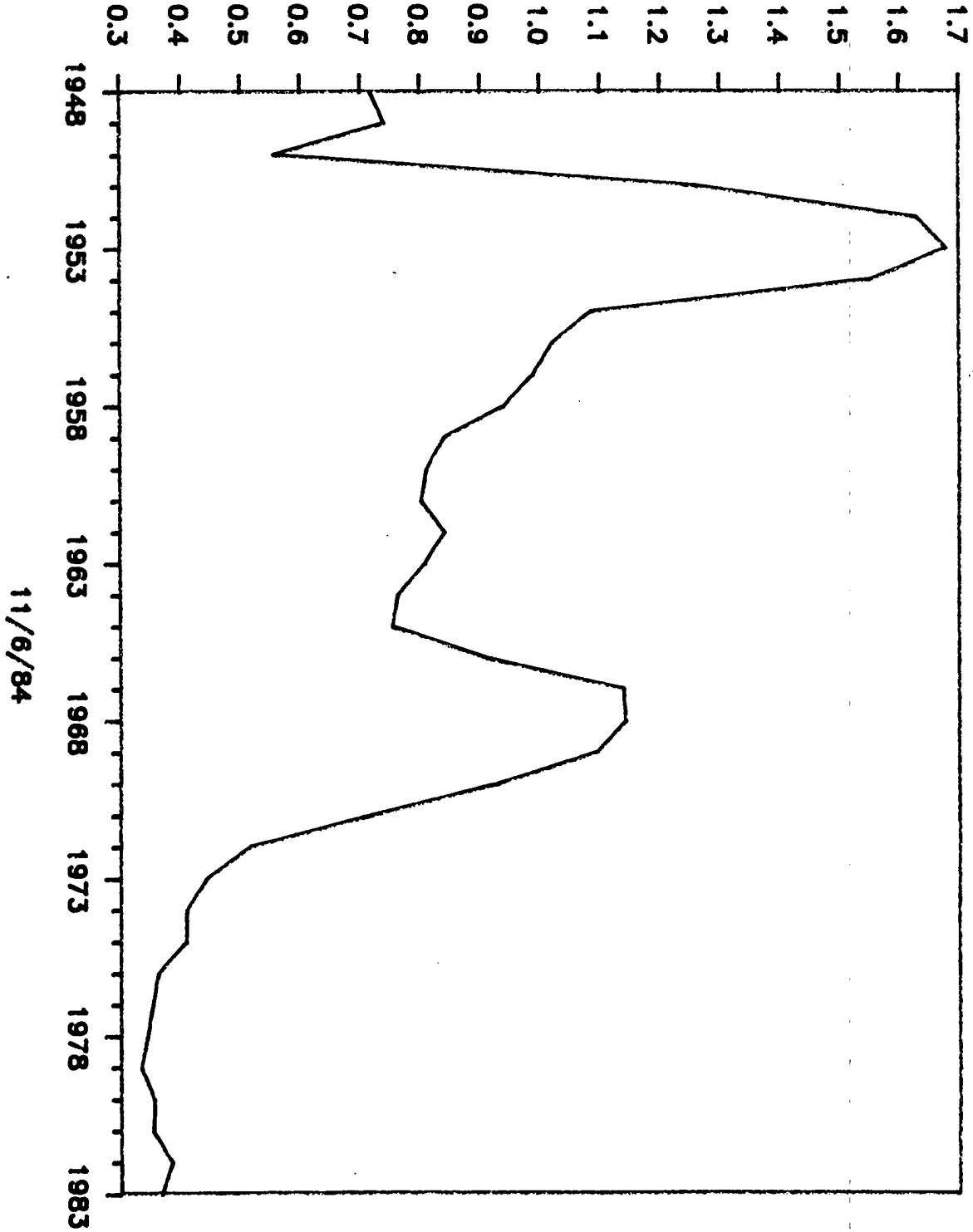
11/5/1984



CIVILIAN UNEMPLOYMENT RATE

1948 TO 1983

SHARE OF GNP



COST OF ARMED FORCES OVERSEAS

AS SHARE OF GNP